THE AMERICAN INSTITUTE.

SIXTH OF THE WINTER COURSE OF SCIENTIFIC LECTURES—DR. B. A. GOULD ON THE CONSTITUTION OF THE SUN.

A large audience assembled in the hall of the Cooper Institute last evening, to listen to Dr. B. A. Gould of Cambridge, Mass., who lectured before the American Institute, on the "Constitution of the Sun." The lecture was profusely illustrated by photographs of the sun, reflected with the aid of a lantern upon a background of white cloth. One of the photographs, showing spots and faculæ, was taken yesterday afternoon by Mr. Lewis M. Rutherford, at his observatory, and was pronounced by Dr. Gould an excellent one. The lecturer was introduced by Prof. Tillman, who announced that the last lecture of the course will be delivered on Friday evening next, by Prof. J. S. Newberry of Columbia College. Subject: "The Colorado Plateau—Its Cañons and Ruined Cities."

Dr. Gould, upon coming forward, was greeted with applause. He said:

LADIES AND GENTLEMEN: It would be a vain task to attempt any investigation of the history of our early astronomical knowledge of the sun. Herodotus relates that Thales of Miletus predicted the total eclipse, which occurred in the year 584 B. C., during the sixth day of a battle between the Medes and Lydians, and which by its awe-inspiring influence brought their five-years' war to a close. We know, too, that Pythagoras and his immediate pupils taught the doctrine, which he probably learned in Egypt, where he had studied, that the sun is the center of the universe, and that the earth revolves around him once a year. Three and a half centuries later, Archimedes correctly determined the sun's apparent diameter as between 27' and 33'.

The determination of the earth's distance from the sun is a problem of peculiar importance, inasmuch as it is the unit in which, by means of Keppler's laws, all the planetary distances are measured. Consequently all our knowledge of celestial distances (excepting only that of the moon) is closely connected with the value of this fundamental standard of measures; and any addition to our knowledge, which shows any one adopted distance to be too large or too small, demonstrates the same for all the rest. This determination is made by the same means used by surveyors for detecting terrestrial hights and distances, by measuring the parallax—i. e., the difference of direction in which the same object appears from different points of view. Mars and Venus, as being the nearest to the earth, offer the greatest advantages for determining parallax, and many observations have therefore been made of these planets at two well-determined points, distant from each other on the earth's surface. The base line between them being well known and the difference in direction in which the planet appears to the observers being carefully noted, it has been possible to compute the length of the other sides of the triangle, which gives us the distance of the planet, and thence can be deducted the distance of the sun, as we know the ratios of their mean distances to that of the earth. The actual mean distance of the sun corresponding to the most probable value of the parallax is 92,380,000 miles; and since his apparent diameter at this distance is 32'.3" (somewhat more than half a degree) we readily find the corresponding true diameter to be of the colossal size represented by 861,232 statute miles. This is nearly 109 times that of the earth; so that the earth, if seen from the sun, would appear but little more than 1-12,000 part as large as the sun appears to us. The velocity of light in stellar space, corresponding to this value of the sun's parallax, is at the rate of 185,600 miles in a second of mean time.

To form some idea of the stupendous distances, magnitudes, and velocities with which we thus become acquainted, let us compare them with some of those with which we are familiar. If we represent the earth by an ordinary rifle-bullet, the sun would be represented on the same scale by a globe of 4½ feet in diameter at a distance of 30 rods; but if we denote the earth by an orange of average size, the sun would appear as a sphere 25 feet in diameter half a mile off. We have seen that light, even with its inconceivable velocity, requires 8 min. 3 sec. to traverse this enormous distance. An electrical signal, traveling with the speed usual upon our telegraph wires, would put a girdle round the earth in about 1½ seconds, yet it would require 1 hour 50 min. to reach the sun. A locomotive engine, moving 40 miles an hour, would consume 263½ years in traversing the distance, and, could we suppose an iron bar to extend from the earth to the sun, a blow or pull given at either end, no matter how violently, could not reach the other extremity for more than 145 days, although vibrations are transmitted through iron at the rate of about 3 1-10 miles (4,983 meters) in every second. The relative size of the sun is represented on the diagram, which represents in true proportion the disks of the larger planets and the orbit of the moon, traced on a circle representing the face of the sun.

THE SUN'S WEIGHT.

The sun's distance and size thus being known, our next question has regard to its weight, or mass, as it is called, when very large bodies are spoken of. Here, too, we have abundant and trusty information, and it has proved easier to weigh the sun than to measure his distance. The weight of any terrestrial object is simply the attraction subsisting between it and the earth, being measured by the force necessary to lift it. Now, by means of large masses of metal or other very heavy material, it has been found possible to exert a measurable gravitative attraction upon small objects, and comparison between the amount of attraction which a body of known weight thus exerts and that exerted by the earth, as shown by the weight of the object itself, gives us the actual mass of our planet. In this way the mass of the earth has been found to be a little less than six sextillions of metric tuns (of about 2,205 lbs. avoirdupois). One more step of the same kind enables us to compare the attraction exerted upon other heavenly bodies by the sun and the earth respectively; and it has thus been established that the mass of the sun is very nearly 327,000 times that of our planet.

We have seen that the diameter of the sun is about 108.8 times that of the earth. His volume or total size, therefore, is about 1,288,000 times, while his weight is only 326,800 times that of our planet. Consequently, he must consist of material fourfold lighter on the average than that of which the earth is composed, his specific gravity being on the whole about 1.38 times that of water.

Since the attraction exerted by a sphere is proportionate to its mass divided by the square of the distance from its center, it is easily seen that the weight of any object at the surface of the sun must be 27.6 times as great as the weight of the same object upon the earth. Anything let drop near the surface of the earth will fall about 16 feet during the first second, but near the sun's surface, it will fall more than 444 feet during the first second; at the end of the next, it would have acquired a velocity equal to that of a cannon ball as it leaves the most powerful gun; and even if let fall at the hight of two miles, it would traverse this distance in less than five seconds.

It was once thought that an exterior shell, surrounding the true body of the sun, was the source of his light and heat, and that within this shell was a comparatively cool, dark body, which might possibly be inhabited by beings not very unlike ourselves. Now that we know the case to be otherwise, and that the interior of the sun must be at a temperature surpassing that of the fiercest fires which can be produced by human art, the question of habitability loses its significance, except perhaps from a theological point of view.

But a consideration which might well have been borne in mind, is the vastly greater weight which all objects at the sun must exhibit by reason of the attraction of his immense mass. A man of ordinary size would there weigh nearly 5,000 pounds, and although we may hardly indorse the younger Herschel's statement "that he would be crushed as flat as a pancake by his own weight," we must concede that it would be a somewhat fatiguing exercise for him to run up and down stairs very often, and that the sun's surface would be rather a hard road to travel.

THE SUN'S HEAT.

The sources of the light and heat of the sun—the only two of his marvelous properties apparent to the ordinary observer—are problems of the greatest difficulty. I will only say here that the most vivid light developed by human art, when interposed between the eye and the sun, appears like a black spot upon the solar disk. The highest temperature yet produced by man is that evolved by the combustion of charcoal in oxygen, which Bunsen estimates at 10,000 C., or 18,000° F.; and this is about five-sevenths of the lowest reasonable estimate for the temperature of the solar surface. Coal burning at the rate of 1 lb to the square foot in about 2 seconds would attain this temperature, and Rankine has estimated that in the furnaces of powerful locomotive engines, a pound of coal to each square foot of grate surface is consumed in from 30 to 90 seconds, yielding a heat from 1-15 to 1-45 as intense as that at the surface of the sun.

Adopting this estimate that a heat equal to that emitted by the sun might be attained by the combustion of coal at this rate of one-half pound per second to the square foot, it is easy to find how long the whole mass of the sun would last, were it composed of coal burning at that rate, and furnished moreover with an unlimited supply of oxygen to support the combustion. Performing the calculation, we find that the entire sun would be consumed in a little more than 4,000 years, that is within a period no longer than over which human history extends.

And now, what is this sun of ours—this center round which eight large planets, with not less than 18 satellites and 109 small planets, are known to revolve, beside comets unnumbered and countless swarms of meteors; this luminary, whose fervent and dazzling beams radiate and have radiated for ages with a profusion which has shown no signs of failing, although the most vehement combustion fails to equal it in heat, and the most intense electrical action falls short of it in light; which, notwithstanding the enormous floods of energy which it is pouring out, has decreased neither in weight nor size to any extent which human skill has sufficed to detect? And does the realm of nature show any other object comparable with it in magnitude or in character? These are among the questions which force themselves on our consideration.

The sun is a star, apparently not unlike the most of those which gem the sky by night. This seems a better statement than to say that the stars are suns, although it would be difficult to give a good definition for either word. Our idea of a sun seems to imply that it is a center for a system of planets or satellites, dependent upon it for their light and radiant heat. There is some ground for believing this to be the case with some of the fixed stars, but for supposing it to be so with most of them there is no reason other than the supposed analogy. But that the sun is a star, one of the same great company which spangle the firmament, and indeed one of the countless myriads which compose the single nebula which we see all around us like a ring and call the milky way, seems a well-established fact. Here, as with them, that same law of gravitation holds unrestricted sway which the double stars reveal to us as the guide and controller of their motions. Like many of them it is variable in its light, although only to a small extent and with a long period. Like them it is journeying through space drawn by some powerful attraction, or performing a stupendous orbit around some center which astronomers have not yet succeeded in recognizing. Its annual motion has been computed by Otto Struve to be 150,000,000 miles.

And notwithstanding its awful magnitude, we must still regard the sun as a comparatively small star, (at least as not above the average size. This is proved by comparing his light with that of the very few fixed stars whose distance can be computed, and can therefore be compared with that of the sun.

When we view the sun through a telescope of moderate power, provided with a deep shade glass, or with a solar eye-piece, we see a bright disk, in which no measurement has yet detected any variation from a perfect circle. This circle is not of equal brightness, the central portion being much more brilliant than the parts near the circumference. Nor is the solar brightness equable in other respects, but the whole surface appears mottled by small variations in brilliancy, which have been compared to the irregularities upon the rind of an orange, and to the uneven surface of a stormy sea.

SPOTS ON THE SUN.

Usually, too, several spots, or groups of spots of irregular and often fantastic shape, are to be seen variously distributed, but almost always within a belt crossing the sun centrally, and not so wide as one-half his diameter. These spots differ in size from the smallest visible one to a breadth of 1', which is 1-16 of the diameter of the sun, and corresponds to seven times that of the earth; and a short period of examination suffices to show that their forms and dimensions are undergoing continual and rapid changes. Ordinarily, and, indeed, always, if of any considerable magnitude, they consist of two distinct parts, each sharply defined, viz.: a dark inner portion called the umbra or nucleus, and an extensive grayish border, much brighter than the nucleus, and called the penumbra. Sometimes, though not often, the sun is seen entirely free from spots, while at other times they are extremely numerous, more than 50 having been seen at one time. Not unfrequently they are visible to the naked eye through a smoked glass.

Finally, yet another appearance presents itself to the observer with a telescope of moderate power, viz.: patches or streaks of light more brilliant than the rest, and not to be confounded with the general mottling of the surface. These are called faculæ, and are generally, but not always, of an elongated form, and chiefly manifest in regions near the limb or margin of the sun, where the fainter light, and some other causes, render them especially conspicuous. Faculæ may almost always be seen in the close vicinity of the spots, and generally to the left of them; but they are not restricted to these situations, and may be found in regions where spots are never seen.

WILSON'S THEORY.

To explain the phenomena of the spots, Domenic Cassini suggested, in 1671, that the sun's surface must be an ocean of light, surrounding the dark and solid central body of the sun, and whose tumultuous agitation sometimes discloses some mountain summit which appears as the black nucleus of the spot. This suggestive idea formed, however, only a first step toward the solution of the problem, the honor of which belongs to a Scotch astronomer, Prof. Alex. Wilson of Glasgow, 100 years later. Wilson observed that the penumbra or grayish border which surrounds the dark nucleus, and which is generally of about equal width on all sides when the spot is near the middle of the sun's disc, always became narrower on the side nearest the middle of the sun, when the spot approached the circumference. Hence he inferred in 1773 that the spots were funnel-shaped apertures in the luminous envelope, which disclosed the dark body of the sun at the bottom, and whose shelving sides constituted the penumbra. A moment's inspection of the diagram will show how such an aperture would at the middle of the disc exhibit the full size of the nucleus, D E, and an equable border, represented by the apparent breadth at C D and E F of the inclined sides of the opening; but that when it is nearer the circumference, as at A B or G H, the nearest side becomes foreshortened, as does also the nucleus, though to a less extent, while the farthest side of the aperture is presented much more fully to the view.

If, therefore, the appearances be as stated by Wilson, the inference seems irresistible that the spots are openings in the glowing envelope of the sun. To make sure of the facts in the case, the Directors of the Kew Observatory have carried out an extensive examination of all the drawings and photographs of solar spots, which they could make available, and the enormous preponderance of observations in favor of this theory must be considered as definitely settling the question. Mr. De La Rue also suggested the use of the stereoscope to decide whether the spots are actually cavities or depressions, with the same result. But this argument, although a strong one, can hardly be deemed conclusive, for our senses are tricky guides, and things are not always what they seem.

But why should the sloping sides of such a cavity manifest that diminution of the solar luster which the penumbra exhibits? Because the darker body of the sun would be partially seen through it, would be our first reply; but a moment's thought will show that were this the true explanation, the penumbra would exhibit different degrees of luminosity, and shade gradually away from full brightness at its circumference to darkness at its inner margin. This is not the appearance; but the boundaries of the penumbra are sharply defined and its color is tolerably uniform throughout. To meet this difficulty the German astronomer Bode, assumed a second envelope of a cloudy nature, supported by an atmosphere, and situated between the true body of the sun and the atmosphere, as the outer light-giving envelope is called. The reflection of the photosphere from this surface would account for all the light of the penumbra, while the nucleus of the spot would be the body of the sun as seen through the opening in this second envelope. Twenty years later, the great William Herschel added the idea that the transparent, elastic atmosphere in which the stratum of clouds must be suspended at a hight of not less than 4,000 miles, likewise supported, and extended beyond, the photosphere. Emanating from the true surface of the sun, this gaseous atmosphere streamed upward, displacing the material of the surrounding cloudy stratum and of the thinner photosphere. It is a curious fact that a hypothesis almost identical with this theory of Herschel had been propounded as early as the middle of the fifteenth century, before the existence of the spots was known to astronomers; yet this must be regarded rather as a fortunate guess than as a scientific theory, for the evidence by which alone such a view can be supported was not then known.

The general aspect of solar spots will be seen by the representations in the diagrams. The enormous magnitude of some spots has been already mentioned—huge chasms which cover an area of some two billions of square miles, and whose mouths would receive at once forty or fifty globes as large as our earth. Their continual and rapid changes of form and size, make it peculiarly difficult to settle many interesting questions concerning them, but decided indications of rotary motion have been observed in many of them, which would imply that they are turning like huge whirlpools around their own centers. The nucleus, although we speak of it as black, and although it appears intensely so in contrast with the glowing radiance of the surrounding portions, is in itself by no means devoid of brightness. It has been well said by Winnecke, that were the light of the whole sun to be extinguished, excepting the portion radiating from the nucleus of a spot, our eyes would scarcely be able to endure the dazzling beams. Herschel's estimate has generally been considered too low, yet it would give the dark nucleus of a spot a luminous intensity, nearly 2,000 times greater than that of the full moon.

A curious and frequent appearance is that of so-called bridges, which often cross a spot, dividing it like partitions. Sometimes these are intensely brilliant, crossing penumbra as well as nucleus, while in other cases they are no brighter than the penumbra, and only perceptible when in contrast with the dark nucleus. Both their formation and disappearance have been frequently observed; tongues of light are seen darting across from one side, or from both sides toward each other, until the bridge is established, and in a way not unlike that which naturalists describe when microscopic organic forms are in process of development; and again they are seen to fade gradually away, growing fainter and fainter, until from an intense brightness they have seemed to dissolve and disappear. These also are depicted in the diagrams.

GRANULAR SURFACE OF THE SUN.

About the year 1863 Mr. Nasmyth announced the discovery that with a powerful telescope of sharp defining power, and under favorable atmospheric conditions, the whole luminous surface of the sun appeared to consist of a thin layer of bright filaments shaped like willow leaves, averaging about 1,000 miles in length and 100 in breadth; that these lay scattered over the sun generally in every variety of direction, across each other, and that the black points were simply the interstices between these willow leaf filaments. This announcement stimulated at once to very minute scrutiny of the face of the sun, and to an active controversy among the observers. All agreed that the luminous surface was composed of bright particles, but Nasmyth's description found but little confirmation. One observer proposed the term rice-grains, as better representing the form of the objects in question, and another compared them to gravel on the beach, and a third preferred the word granulations. The facts established have been very clearly set forth by Mr. Huggins of London. The granules are of various sizes, but may on the average be roughly taken as about 1½" in length, and 1" in breadth, corresponding to about 675 by 450 miles. Some are nearly round, others oval, and others still almost without symmetry of outline. The coarser mottling of the solar disc arises chiefly from the alternation of lines or groups of closely aggregated granules and of regions in which they are less abundant. The points are the interstices between them, as they appear through a telescope of insufficient power. Mr. Huggins sums up most admirably by saying, "The phenomenon would be well represented if we might suppose that the granules are recently condensed incandescent clouds; that they slowly sink, merge into each other, become less and less luminous, and gradually dissipate into comparatively non-luminous gas. The dark pores would then be represented by the portions where complete vaporization had taken place." He also gives an interesting diagram, which is here reproduced in a drawing by Prof. Morton to show the distribution of the bright granules on those parts of the sun which are free from spots, in some of the most characteristic forms of their grouping. Thus it seems established that the luminous surface of the sun is entirely composed of these glowing particles or granules, almost as small as we can see, notwithstanding that they can scarcely be less than 700 miles in length, floating in a sea of darker though luminous fluid matter. The brighter and the darker mottlings of the ordinary surface, the brilliant glow of the faculæ, and the dimmed luster of the penumbra, must alike be referred to the intrinsic splendor of individual granules, distributed in various ways, arranged more or less compactly and at different degrees of submergence in the fluid medium which supports them. Lockyer, a young English astronomer, who has done much to advance our knowledge of the constitution of the sun, says that he has seen the granules in the penumbra change their axial directions, and others, visible against the nucleus as a background, gradually to melt away. Chacornac says, moreover, that the granules, or crystals as he calls them, may be seen dissolving away like crystals of sugar before a jet of steam, becoming spotted over with dark points before they finally disappear.

DIMINUTION OF THE SUN'S FORCE.

The great fact, to which I have more than once alluded, that the sun is practically our only source of earthly power and energy, gives a peculiar interest to the question whether his brilliancy or thermal energy are undergoing any perceptible diminution. That they are diminishing we must assume on general principles, inasmuch as we know to what an inconceivable extent he is radiating force in the various forms of heat, light, and chemical power, and force once emitted from a source of such superior energy is not returned to it again, while a new creation of force by natural agencies is just as impossible as a new creation of matter. But whether any diminution of radiant energy in consequence of the enormous expenditure is perceptible by our means of investigation is a most natural and important question, and to this it must be answered that no appreciable decrease has been detected. Few observations available for the purpose have been bequeathed us by the astronomers of former days; but from some careful observations made in 1801 by the distinguished astronomer, Olbers, upon the brilliancy of Mars, which depends, of course, upon reflected solar light, Prof. Seidel of Munich was able to prove in 1859 that the solar light had not diminished in the interval to any measurable extent. It has been well said, that had some of the old Greek metaphysicians once dipped a thermometer in the Kissus, and recorded the date and temperature, it would have added a thousand fold more to our knowledge than all their speculations did. We can forgive them for this omission, if for no other reason than that they had no thermometers to dip; but had they ever recorded the average date of flowering of any common plants, we should be able to thank them for at least some materials whence we could deduce valuable geological and even cosmological knowledge.

In 1843, after Schwabe had carried on his spot observations for 16 years, he discovered that their frequency was periodic, and he estimated the length of the period at about ten years. Subsequent observations have most fully corroborated this important discovery, and the accompanying tabular view presents a summary of the results obtained by Schwabe since the beginning of his series of observations.

FREQUENCY OF SPOTS ON THE SUN.

Year.	No. of Days.	No. of Groups.	Days without Spots.	Year.	No. of Days.	No. of Groups.	Days without Spots.
1826	277	118	22	1848	278	330	0
1827	273	161	2	1849	285	238	0
1828	282	225	0	1850	308	186	2
1829	244	199	0	1851	308	151	0
1830	217	190	1	1852	337	125	2
1831	239	149	3	1853	279	91	4
1832	270	84	49	1854	334	67	65
1833	267	33	139	1855	313	79	146
1834	273	51	120	1856	321	34	193
1835	244	173	18	1857	324	98	52
1836	200	272	0	1858	335	202	0
1837	168	333	0	1859	343	205	0
1838	202	282	0	1860	332	210	0
1839	205	163	0	1861	322	204	0
1840	263	152	3	1862	317	160	3
1841	283	102	15	1863	330	124	2
1842	307	68	64	1864	325	130	4
1843	312	34	149	1865	307	93	26
1844	321	52	111	1866	349	45	76
1845	332	114	29	1867	312	25	195
1846	314	157	1	1868	301	23	101
1847	276	257	0				

In 1852, nine years after Schwabe's discovery, Prof. Wolf of Berne, was led by careful study of the observations in connection with ancient records to a modification in the length of the period, which is now fixed at about 11 1-9 years. He also succeeded in proving that this period answered also to the variations in terrestrial magnetism better than that of 10⅓ years previously found by Lamont in Munich. Thus it became evident that the interval at which the phenomena periodically repeat themselves is the same for solar sports and for variations in the direction of the magnetic needle, or at least that any difference in the length of the periods is too small to be detected, and it is but natural that so remarkable a coincidence should suggest an identity of cause. Whether this is really so or not, we have no other evidence to decide.

THE SUN'S LIGHT.

In addition to the study of the quantity and intensity of light, two modes of investigating its quality are known to us. One is by discovering in what planes the luminous undulations occur, the other is by determining the proportion of rays each degree of refrangibility which it contains. By the first method, viz: by the use of the polariscope, we are generally enabled to discover if light reaching us has been reflected, or directly emitted by the luminous body, and if that body is solid, liquid, or gaseous. By the second, viz: by the use of the spectroscope, we are enabled to analyze each ray of solar light, and to infer from what incandescent chemical elements it comes, at what temperature it has been emitted, and through what forms of vapor it has passed. Few subjects are more fascinating than these, but I may not stop to set forth the processes involved, or to speak of the still active progress of discovery in these directions.

Thus far, ladies and gentlemen, I have endeavored to give you a sketch of the principal facts which have been discovered concerning the sun. Before asking you to give a very few moments' attention to a summary of the best received theories to account for the origin of his light and heat, and the probable length of time during which they have already existed and will continue to exist, I will say a few words on eclipses, and show you upon the screw various representations of them.

ECLIPSES.

The first sight which attracts attention when the last direct ray of the sun has been cut off by the advancing moon is this round orb in almost inky blackness against a luminous background, and the whole surrounded by a bright glory, which has received the name of the corona, or crown. This appears to have been seen in all total eclipses, for even ancient Greek authors mention it; yet the descriptions and representations of it vary in a remarkable degree. In some of the drawings it is depicted as a bright halo, concentric with the black disc of the moon, and of nearly uniform width; in some it is a glory of radiant beams; in others some of the beams are twice or three times the length of the rest; sometimes there are four, sometimes two, sometimes six such projecting beams of light. In judging of the degree of accuracy in these, there are many considerations to be kept in mind, such as—that the corona has only lately been made the subject of special observation; that the observations have generally been made through telescopes which magnified too much to allow the whole disc of the sun and moon to be seen at once; and that the sketches have almost always been made from memory at some subsequent time. I will show some of the representations which have been published, that you may more fully appreciate the diversity of forms, assigned to the corona by different observers.

THE "CHROMOSPHERE."

In the views of total eclipses which I have exhibited, you have probably observed another strange appearance, which is never absent though often vailed from the naked eye by the brilliancy of its background of luminous radiance. I allude to the excrescences from various portions of the sun's disc, which are most frequently seen as rose-colored, sometimes, however, deep red, clear white or even yellow. These are actually portions of the sun, and the moon in her motion gradually hides those in front of her, and discloses those which are on the other side. They are called the protuberances, and it is only within the last two years that we have attained any definite knowledge of their character. They are not always even in apparent contact with the sun, but often seem to float like clouds above his surface, and assume many fantastic shapes, curved, forked, twisted and jagged.

But it was the spectroscope, which at this total eclipse of 1868 was for the first time directed to the protuberance, that the largest additions to our knowledge are due on that occasion. By means of this wonderful instrument it was found that the protuberances are very unstable and variable in their forms, and in fact merely local aggregations of a gaseous medium which entirely surrounds the sun, and may at any time be detected by the spectroscope in any part of the limb. For this envelope, which is a real one, Lockyer proposed the name of "chromosphere," and its structure and chemical composition have since that time been the objects of continual investigation by numerous observers. It has been satisfactorily established that the light which it sends us is chiefly due to incandescent hydrogen, and usually contains indications of the presence of sodium, barium, magnesium, iron, and perhaps other metallic elements.

MECHANICAL ORIGIN OF THE SUN'S LIGHT AND HEAT.

I will exhibit finally two photographs of the eclipse of last August, one by the Nautical Almanac party, with short exposure, and exhibiting but little coronal radiance, and one by the Coast Survey party with much longer exposure, and showing a very considerable glory round the sun. On this occasion I gave my own particular attention to the form of the corona, and the directions of prominent beams, and devoted a large share of the three minutes to measuring its dimensions and sketching its outline. Here are three drawings of its appearance at intervals of a minute, and I think they establish the fact that for the same observers, and at the same place, its aspect is undergoing continual variation. The facts being now manifest that the forces radiating from the sun cannot be due to combustion, inasmuch as this would be inadequate to afford the supply; and yet, that they must be in process of continual development from sources in which it previously existed in some other forms than as heat and light, since some amount of cooling and fading would otherwise inevitably be within the range of our detective powers, there remains but one explanation open to us out of all those which science can at present suggest. This is that the light and heat are the results of mechanical action, and that forces which were previously engaged in producing motion, are by the arrest of that motion, made to appear in this new form, just as iron grows hot under the blows of a hammer, or an axle takes fire in consequence of friction. From this inference there seems indeed no escape; but what is the motion which is thus converted? And where are the moving bodies, which are endowed with such mighty force, and are encountering such enormous resistance as to evoke the tremendous radiance of the sun from a previous momentum adequate to produce it?

Dr. Gould then gave an account of the meteoric theory of solar heat, and showed the objections which could reasonably be urged against it, and then proceeded to explain the theory of contraction, to which he gave his adherence, as well as in general to the theory of Faye, according to which the sun is a gaseous mass at a high temperature, the outer circumference being condensed by the extreme cold of the planetary spaces.

THE AMERICAN INSTITUTE OFFICERS.

At the election for officers of the American Institute, on Thursday evening, two tickets were submitted to the members. One of these was printed in THE TRIBUNE yesterday, but as the list contained many inaccuracies, the following corrected and regularly chosen ticket is published:

President—Horace Greeley.

Vice-Presidents—Gen. Wm. Hall, Charles P. Daly, the Hon. N. C. Ely.

Recording Secretary—George Peyton.

Corresponding Secretary—Samuel D. Tillman.

Treasurer—Sylvester R. Comstock.

Managers of the Fair—William H. Butler, Orestes Cleveland, J. Groshen Herriot, Charles Wager Hull, Wm. S. Carpenter, George Timpson, J. Wilson Stratton, James Knight, Thomas Hicks, Thomas Rutter, Samuel R. Wells, Wm. E. Pearce, Joseph B. Lyman, J. Trumbull Smith, Walter Shriner, Thomas D. Stetson, James R. Smith, E. S. Dickinson, Charles H. Clayton, Henry J. Newton, Chas. Roome, Oscar A. Mathusius, Francis Everdell, Charles E. Burd.

Committee on the Admission of Members—Thomas C. Smith, James H. Drake, John W. Chambers, J. Owen Rouse, Stephen R. Krom.

Committee on Finance—Thomas M. Adriance, Thomas Williams, jr., Charles Chamberlain, Simeon Baldwin, J. De Lamater.

Committee on the Library—James K. Campbell, Edw. Walker, Dubois D. Parmelee, Stephenson Towle, Oscar G. Mason.

Committee on the Repository—M. M. Livingston, Albro Howell, Nathaniel Wheeler, Frank A. Butler, C. Williams.

Committee on Manufactures and Machinery—Hamilton E. Towle, G. H. Babcock, Robert Weir, Chas. E. Emery, Frank L. Pope.

Committee on Chemistry, Mineralogy, and Geology.—Chas. F. Chandler, Dubois D. Parmelee, Julius G. Pohlé, J. S. Newberry, Albert G. Kelley.

Committee on Optical Science—John E. Gavitt, John B. Rich, John Frey, L. Bradley, P. H. Vander Weyde.

Committee on Civil Engineering and Architecture—William J. McAlpine, Hamilton E. Towle, Robert G. Hatfield, Samuel McElroy, Edward T. Renwick.

Committee on Agriculture—Nathan C. Ely, P. T. Quinn, John Crane, T. M. Hexamer, Josiah H. Macy.

Committee on Horticulture—William S. Carpenter, John Henderson, Benj. C. Townsend, Isaac Buchanan, James Hogg.

Committee on Commerce—Thomas Godwin, J. V. C. Smith, Edmund Dwight, James H. Backett, John H. Macy.

THE ERIE RAILROAD STRIKE.

THE MEN A PREY TO RUMORS—THE AGREEMENT BETWEEN THE MEN AND THE COMPANY.

The men out of work at Long Dock had, yesterday afternoon, received no news from the delegates whom they sent up the road on Wednesday evening, and, in the absence of authentic intelligence, Rumor is busy, as usual. One of the reports which gained most general circulation and credence was that Susquehanna was "out." From what Mr. Allen stated in Washington Hall, the report had its origin in something said by passengers and brakemen who had come along the line. Mr. Curran, who is attending to telegraphic matters, telegraphed to Susquehanna, about noon, asking for information, but had not received a reply by the time of the afternoon meeting.

One man said he heard that Mr. Brown had yesterday morning brought over 11 Germans, escorted by a number of police, but that on learning the facts connected with the strike they went back again. Another said he had heard that Mr. Rucker was hiring all who came along, at the Opera-House, and that he would bring a large multitude over this morning. Thereupon it was proposed to detail a large party to go over to the Opera-House this morning and watch it, and also to detail a force to watch the Chambers-st. ferry on the New-York side. The proposition was received with favor, but was not formally adopted in open meeting, it being thought better to make the arrangement in private. There is not a particle of truth in these rumors. Equally without foundation was the assertion that a party of 200 Germans had got their dinner at the Company's expense in this city, and were about coming over to work; but, on the strength of it, a man asked that some who could speak German be sent with him, and he would put the whole army to flight. One or two new comers, who had been diverted from the shops, complained that they were in distress.

Capt. Hill, who watched the machine-shop, reported that some men came over looking for work, at 1 o'clock p. m., but that they had all gone back again.

Mr. Allen made some remarks at the afternoon meeting, in which he said that this was the longest strike they ever had, and it would be the last. Such provision had been made that there would be no more strikes. Which ever side won or lost now, would win or lose forever.

The Company is not in the least weakened by the defection of the men. The road never was in better running order. There has been no need to take off a single engine. The plan that will be adopted, if needful, is to send engines lying for repairs at Jersey City over to Port Jervis, where the work will be done. This explains the order to increase the number of employés there, as reported in yesterday's TRIBUNE. To show the completeness with which the road is equipped, and the Company's independence of the men now out, the fact may be mentioned that within the last 60 days 18 new engines have been placed on the road. Five new men were taken on at the shops yesterday, and there were 11 applicants who said they would commence work this morning. The men in the tunnel shop did not turn out yesterday, as the strikers had reported they would.

The following telegram was received yesterday forenoon by Mr. C. W. Tufts, engine dispatcher at Long Dock:

SUSQUEHANNA, Jan. 21, 1870.

To C. W. TUFTS: All quiet. A meeting was held last night, but could not agree. S. J. MAYO.

In the afternoon the following was received:

PORT JERVIS, Jan. 21, 1870.

To C. W. TUFTS: All right here. Strikers are at a discount. ABBOTT.

The following is a copy of the agreement, which the men say the Company violated:

OFFICE OF THE GENERAL SUPERINTENDENT ERIE RAILWAY, Oct. 26, 1869.

This Committee agree to make the pay day the 15th of the month (except Jersey City, which shall be paid, as heretofore, on the 12th), with this understanding, that if anything should happen making it utterly impossible for the Company to be ready, to wait a few days, but not later than the 25th.

JAMES FINDLAY, Buffalo. GEORGE KRASLEY, Jersey City.
THOMAS HOLT, Port Jervis. W. COCKAYNE FRITH, Susquehanna.
Approved. JAY GOULD, President.

On Wednesday night the strikers had a meeting at the Catholic Institute, and made arrangements for a ball, to be held at Cooper Hall, on Monday evening. Subsequently they were waited upon by a Committee of two from the German machinists and metal workers of this city, who congratulated them on the stand they are making, and offered material aid should the men accept it. A vote of thanks was passed. A communication was received from Father Mathew T. A. B. Society No. 1 of Jersey City, offering the free use of Washington Hall as long as the strike lasts, and remitting the rent already incurred, amounting to $7 50.

THE POLICE COMMISSIONERS.

THE NEW FIRE ALARM TELEGRAPH—ROUNDSMEN APPOINTED—CAPT. STEERS.

A meeting of the Police Commissioners was held yesterday afternoon. Charles S. Gildersleeve, Secretary of the Board of Fire Commissioners, sent in a communication, requesting that alarm boxes may be placed on the Station-Houses as they would be found useful and convenient in affording facilities for rapid communication of alarms of fire. It was referred to the Superintendent with instructions to have the boxes placed inside the Station-Houses in such manner as he may approve.

Patrolman John Burke of the Forty-second Precinct was dismissed the Department for being absent from duty without leave.

The following patrolmen were made roundsmen, and transferred to the Precincts named: Michael Flanagan, from Third to Fifteenth Precinct; Christ. Boehme, Eighteenth to Twenty-second; Thomas McParlen, Twenty-first to Twenty-first; Michael M. Rooney, Twenty-first to Twenty-third; Patrick Connolly, Twenty-third to Twenty-first; Thos. F. Westerman, Eighth to Twentieth; John G. Schultz, Sixth to Fifteenth; Wm. McSally, Sixth to Twentieth; Chas. W. Griffith, Twenty-fourth to Twelfth; David W. Samuels, Fourteenth to Twenty-second.

The statement that Capt. Thomas Steers of the Second Precinct has resigned, is incorrect. His resignation has not been received by the Commissioners, but it is known that he has for some time past contemplated resigning, and only withholds his resignation for a time. He is a worthy officer, and has been for many years on the force.

POLICE TRIALS.

At the trials of policemen yesterday Patrolman Jacob L. Codett of the Forty-third Precinct was charged with drinking, being off post, and using language unbecoming an officer; the case was referred to the full Board. Doorman Rodgers and Patrolman Irwin of the Forty-third Precinct will probably be dismissed for fighting in the Station-House. The cases of Patrolman Hendricks of the Fiftieth Precinct and Patrolman McDougall of the Twentieth Precinct, charge intoxication, were referred to the full Board. Patrolmen Bell, Taylor, Fulner, and Stagg of the Fifth Precinct, charges of failing to prevent the commission of a burglary or to arrest the burglars, were handed over to the care of the full Board, as was also Patrolman Coy of the Sixteenth Precinct, charged with arresting, releasing, and subsequently threatening to assault one Michael Lynch of Tenth-ave.

THE COURTS.

SUPREME COURT—CHAMBERS.

Before Mr. Justice Cardozo.—George Francis Train agt. the Union Pacific Railroad, Eastern Branch.—This case was transferred to the United States Circuit Court under the act of 1867, by an order of Judge Ingraham. Subsequently Judge Ingraham granted an order to show cause why his previous order should not be vacated, and the case came up on this motion.

Judge Cardozo refused to entertain the motion, holding that the case once sent to the United States Court, whether properly or improperly, or rightly or wrongly, the State courts had entirely lost jurisdiction, and any error or mistake in that order could only be corrected by that Court in which the suit actually was. Motion denied. Clark Bell for motion; Charles Burrill opposed.

Arrest of a Defaulting Cashier.—The Merchants' Exchange National Bank have commenced a civil suit against their defaulting Cashier, E. J. Oakley, and in it have had him arrested, and, in default of $150,000, confined in Ludlow-st. Jail.

The Washington Marine Insurance Company Litigation.—In re Petition of Wood.—This is a petition to remove Mr. John B. Haskin from the Receivership of the Washington Marine Insurance Company, which failed some eighteen months ago, on the ground that he had been negligent in the collections of the assets, and had not attended properly to his duties as Receiver. In reply, Mr. Haskin claimed that this proceeding was instituted in the name of Wood by E. R. Meade, counsel for the Receiver; that, on taking the Receivership, he had found Mr. Meade employed as counsel, and had continued him, and that whatever negligence there had been was more the fault of counsel than his own. The Court took the papers, reserving its decision.

SUPREME COURT—GENERAL TERM.

Before Ingraham, P. J., Barnard and Brady, J. J.—Purchasing Property for another.—Peter C. Ackerman agt. John M. Ackerman and Jane Ackerman.—The plaintiff bid in, several years ago, some property sold by the city at about $16,000. Being unable to raise the money, his brother John advanced $4,000, and he being unable to pay all the cash required, Mrs. Ackerman, his wife, stepped in and paid $8,000, and her husband's advance of $4,000, and took the title and possession of the property, giving in her own name a mortgage to the city for the balance. She claims that he assigned away all his rights to her. Plaintiff claims that she merely took it for him. The referee found that he was entitled to the property, subject to the lien of her advances, and she appealed, claiming that the decision was contrary to the spirit and purport of the statute of frauds, and that she was wronged in not allowing her interest, and in charging her with costs. The plaintiff replied that the costs were proper, she being defeated; the rents were more than the interest, and that no writing was necessary in such a case.

The Court affirms the main order, but modifies it so far as to give the plaintiff but six months in which to redeem his property by paying Mrs. Ackerman her $12,000, with interest from the date of the judgment, and relieves her from costs. Mr. B. North for plaintiff; Mr. Bryan for defendant.

In re New-York and Harlem Railroad.—It may be remembered that Commissioners of Appraisal were appointed of the value of the portions of streets which would have to be taken for the proposed new Harlem Railroad Depot. This included 150 feet of Forty-third and Forty-fourth-sts., and all of Fourth-ave. between Forty-second and Forty-fifth-sts., except a strip of 60 feet. The Commissioners reported that as this property was held by the City merely in trust for traffic it was not near so valuable as if held absolutely in fee, and therefore awarded the City but $25,000. The report was confirmed, against the arguments of the counsel for the City, that the streets could not be taken from the City for any purpose other than that for which they were originally dedicated to the public, and that if they could be so taken they reverted to their full force, and that in this view the Commissioners' award was grossly inadequate. From the order confirming the report the city appealed.

After the appeal the Company paid to the City Chamberlain $25,000.

The appeal comes on to be heard. Counsel for the Company moved to dismiss the appeal on the ground that the city had accepted the award, and thereby precluded itself from the appeal.

The Court did not think the payment, under the circumstances, a bar to the appeal, and therefore denied the motion, but directed the main appeal to go over the term, one Judge suggesting that the Legislature would probably settle the question in the meantime. Mr Rapallo for the Company. Mr. O'Gorman for the City.

Court Notice.—Ordered: All applications for orders must be made to the Justice assigned to hold the Chambers except during his absence therefrom when, in cases of emergency to be satisfactorily explained, they may be made to any other Justice, provided, however, that the order applied for shall not conflict with one previously made and existing. And hereafter no motions founded on notice or orders to show cause shall be heard except by the Justice assigned to hold the Chambers unless he shall otherwise request.

Ordered: Applications for a reargument at Special Term must be made to the Justice who heard and decided the motion or proceeding.

A Mistaken Title.—Wm. Provoost, Executor, agt. John S. Provoost, imp'd.—In 1826 Wm. T. Provoost died, leaving a will devising real property to his executors in trust. Under this will his children seemed to think that they were entitled to direct interests to the estate, and under this mistake George Provoost executed a mortgage on his interest to one Charles Carpenter for $1,500. George becoming insolvent, John L. purchased his interest, and made a new mortgage of it to Carpenter in lieu of the old. The mortgage was foreclosed, but no sale was made under the foreclosure. George Provoost died, and, under the decision of the Court, his children held the share in their own right which would have been his had he lived. The present action was commenced in 1865, and Phebe Jane Carpenter as owner of whatever rights there were under this mortgage was made a party. On the trial the Court held that the mortgage passed nothing, but decided that John S. Provoost was liable for the money adjudged in the foreclosure to be due on it, and directed that this amount be paid out of his share. Mr. Provoost appealed, claiming that the findings did not show that there was any consideration for the mortgage, or any bond shown, and that therefore it was wrong to declare any personal liability in the mortgage; that in fact the proof was that John S. Provoost got no consideration. The respondent claims that the decree was correct, but if not, still she is entitled to the money from some share, and as Mr. Provoost has only appealed from the part relating to her, his appeal is defective.

The Court reserved its decision. Douglass Campbell and Judge Hilton for Appellant; Noah Davis for respondent.

UNITED STATES COMMISSIONERS' OFFICE.

Ignatz Elosky and Adolph Elosky, father and son, and two of the persons charged with being concerned in the commission of frauds of the Eighteenth-st. distillery, have surrendered themselves before Commissioner Osborn. Ignatz gave $5,000 bail to appear for examination, but Adolph, who was only 12 years old at the time of the commission of the alleged crime, was discharged on his own recognizance.

"Reddy the Blacksmith."—"Reddy" has settled his case in which he was charged before Commissioner Osborn with non-payment of tax as a retail liquor dealer and billiard-table proprietor at No. 7 Chatham-square, by paying his tax, penalties and costs, amounting to about $75, and has been discharged.

The Fourth National Bank Case.—The case of William F. Veltman, the clerk of the Fourth National Bank who was charged with defrauding the bank by means of forged checks and false entries, came on for examination before Commissioner Shields yesterday.

Billopp Seaman, cashier of the bank, testified that Veltman had been connected with the bank as collection clerk and bookkeeper about five years; he (witness) had examined the books kept by Veltman for 1868 and 1869; found a false entry made on the 15th of April, 1868, of $3,000; on the 11th of August, 1869, a false entry of $1,000, and on the 7th of October, 1869, a false entry of $3,000; the first entry was to the credit of William Leith; Veltman confessed to having made that false entry; I told Veltman it would be better for him to make a clean breast of it, and he confessed to having made the entry. Counsel for Veltman objected to all this evidence, on the ground that Veltman had been induced, by a promise, to make the so-called confession, and that witness's testimony that the entries were false was not legal evidence of their falseness, but only opinions of the witness.

At this stage the further hearing was adjourned to 11 a. m. on Monday next.

CRIMINAL.

At the Tombs Police Court, yesterday, before Justice Dowling, was brought Samuel Taylor of No. 47 Grand-st., for having stolen a case of boots from the store of Joseph Blum, at No. 50 White-st. He was caught in the act and committed.

In the Court of General Sessions, before Judge Bedford, Ellen Rebecca Utt was sentenced to one year in the State Prison, on the charge of causing the death of Patrick O'Conor....Frank Kaiser, charged with burglary, was acquitted....Thomas Lyons, charged with receiving stolen goods, was acquitted by direction of the Court....Joseph Munster plead guilty to an attempt at grand larceny, and was sent to the Penitentiary for one year.

At the Jefferson Market Police Court, before Justice Cox, Charles Hammond, a boot-black, age 14, living in Elizabethport, was committed for trial on a charge of having attempted to steal a quantity of human hair, worth $250, from the store of Arthur Gentil, No. 815 Broadway, on Thursday. A saleswoman saw Hammond and two others enter the store and stop at the show-case where the hair was kept....Thomas Cunniff, age 19, a butcher, was committed to answer in default of $2,000 bail for burglariously entering the shoe-store of Christopher Hackett, at No. 400 East Sixteenth-st. Boots and shoes of the value of $52 50 were stolen. An accomplice, James Kearney, was arrested on the night of the burglary, the 11th inst., by Officer Little of the Eighteenth Precinct, and was held to answer....James Gallagher of No. 22 Downing-st. caused the arrest of James Owens, age 18, a butcher, whom he charged with forcing open a door of his dwelling on Wednesday night, and, together with another boy, who has not been arrested, carrying away a gold watch, a clock, and some money, all of the value of $65. James Broderick, who lives in the same house, saw the two leaving, carrying the bundles with them. Failing to give $2,000 security, Owens was locked up for trial.

DESPERATE ENCOUNTER WITH A BURGLAR.

John Fogle, residing in the Widow Benson's house on the Pelham road, Throgg's Neck, was awakened by hearing strange sounds about his dwelling, at an early hour on Thursday morning, and quickly dressing and arming himself with a hatchet, he went to the first floor and waited. All attempts to effect an entrance through the windows proving abortive, the door was resorted to, and in a few seconds swung noiselessly open, when Mr. Fogle raised the hatchet and dealt the disturber of the peace several severe blows with the blunt edge on the arm. Maddened by the attack he dared Mr. Fogle to go outside, telling him he would "fix" him if he did, when that gentleman again struck him a blow on the cheek that sent him reeling to the floor. Not wishing to kill the rascal, and as he begged piteously for his life, he was told to rise, when he threw himself on Mr. Fogle, using his boots freely, and tearing his clothes and bruising him badly. Grasping the hatchet which he had almost lost, and freeing his arm, Mr. Fogle dealt the fellow such a powerful blow on the head as to knock him prostrate. Again he pleaded for his life, and thinking him too much disabled to do further mischief he was permitted to rise, when he rushed out of the door and through the fence and disappeared in the darkness. He left a felt hat, which may yet lead to his apprehension; and as his wounds were really severe it is surmised that he has not gone far.

SAD ACCIDENT IN NEWARK.

A very sad accident occurred, which resulted in the death of one little boy and the serious injury of two others, at the corner of Clay and Ogden-sts., Newark, on Thursday evening. It seems that a little boy 4 years of age, the son of Mr. John Killet, and two others of about the same age, children of Mr. John Mulford, were playing around a quantity of timber piled up there, when it suddenly toppled over, and several heavy beams fell on the boys. Young Killet was fearfully crushed and disfigured. He died four hours after the accident. The other two children are in a dangerous condition, but they are expected to recover. Mrs. Killet, the mother of the dead boy, is in destitute circumstances, and was away from home washing at the time of the accident.

THE MIDLAND RAILROAD.

The surveys for the route of the Midland Railroad through Passaic County, N. J., have been finished. The route crosses the Passaic River near Riverside, passes through the Bocht, crosses York-ave., Paterson, north-west of Broadway, runs through the Derrom property, cuts left the corner of Simonton's lands, follows Vreeland-ave., and crosses the Passaic River again near the Market-st. bridge. Thence it runs to Hackensack. It is understood that the Company has obtained a lease of water frontage in the vicinity of the Elysian Fields.

A LETTER FROM CASSIUS M. CLAY.

To the Editor of The Tribune.

SIR: I have never been in a habit of reporting my speeches for the press or correcting reports made by others; but, for fear your report of my remarks last night may do injustice to others as well as to myself, I beg the favor to make here a summary of what I did say. Before entering upon the subject of the night's meeting, I begged to allude to two events of my personal history, which had stood unexplained by me for eight years, and were much misconstrued by my enemies. I then said my "*London Times* letter," so much denounced, was not initiated by me, but written by the request of most of the prominent Americans then in London in 1861—that it was approved by Gen. J. C. Fremont, and was especially submitted to and corrected by the Hon. J. L. Motley, our present Minster in England. The letter was an appeal to the anti-Slavery antecedents of the British nation, every way complimentary, and intended to reach the sympathies and sense of justice of that people. The same motives influenced us in an appeal to the French people. That these efforts, for which I personally suffered, were not unfruitful in result, is proven by the fact that both the French and English Governments were opposed in their unfriendly course toward America by the people of those nations, and they found in the long run "the fire in the rear"—in the language of Gen. Scott—more formidable than that in front. I intend also to explain why I returned to Russia in 1863, instead of entering the army with the rank of Major-General. On my recall in 1862, I found the whole Union army returning slaves to their Rebel owners, from all parts, even in the District of Columbia. I refused to fight in any such foolish way, seeing that slaves were the chief support of the Rebel armies, and knowing that Slavery was the "corner-stone," (to use Stephens's language), of the Southern Confederacy. I so told President Lincoln; and advised him that nothing but a proclamation of freedom to all slaves would save us from foreign intervention and defeat at home. Mr. Lincoln agreed with me in sentiment, but said he feared, that under such a proclamation, Kentucky would join the South, and he thought we could not afford to lose that State. I assured him that Kentucky had already made her choice for or against the Union, and no parties would be changed by such action on his part. He then gave me a written order, countermanding the order given me by Gen. Halleck to report myself at once to Gen. B. F. Butler at New-Orleans, and sent me on a confidential mission to Kentucky to sound public sentiment. I went to Frankfort, was heard in the Hall of the Representatives by the House and Senate of Kentucky, in which speech I took ground in favor of liberating the slaves as a war measure, which was approved by the leading men of the State. That speech, reported in *The Cincinnati Gazette* of September, 1862, I showed to Mr. Lincoln, and made my report, and in a few days—on the 22d of September, 1862,—he made his celebrated Proclamation of Freedom. In this confidential action of mine, I submitted to unmerited censure, I preferring to return to Europe, rather than be subject to the unfriendly orders of Gen. Halleck, who had been active in returning slaves to their masters, and who showed his displeasure so much that even Chief-Justice Chase, who had gone with me to the War-Office, advised me to return to Russia. I believed I could be more useful there than in the army, which was not my profession, and I thought the experience of the volunteer generals was proof of my good judgment in this action.

With regard to Cuba, I shall be brief. I hold that the British Government had a right to declare belligerency of the Confederate States on the 13th of May, 1861. They were organized *de facto* governments—had made war upon the Union troops, and captured Union forces and forts. Besides, they had received Mr. Seward's proclamation of the blockade of the Southern ports, made on the 17th day of April, which acknowledged the belligerency of the South—when he should only have declared the ports of entry closed. And, if they had not received that proclamation, the argument in favor of a state of war is increased by the fact that the two nations, without the knowledge of each other's action, had come to the same conclusion that there existed such a war as called for the proclamations of both Governments. I therefore held, with President Woolsey of Yale College, that the declaration of neutrality belongs to each Government for the regulation of its own citizens and their rights; and, although it may be an unfriendly act, is not one for which it may be ordinarily called to account. But the question was settled by President Grant in his message to Congress; and therefore the position of our diplomacy in mixing up the Alabama claims with the subject of belligerency was a false one, on our part; and we must back down squarely before we can hope for a settlement of those claims. There were three ways of settling private as well as national wrongs: to call upon the wrong-doer to apologize and make reparation, or fight it out; to exercise Christian forgiveness and oblivion; or to seek a mean advantage, when your enemy was at your mercy. This last was the attitude in which our diplomacy had placed us, and, as a citizen of "the great Republic," I protested against it. England hated us in 1861, feared us in 1865, and contempts us in 1870. Having stated the tyranny and wrongs toward Cuba, and cleared away the Alabama claims, used as a bar to the recognition of belligerency, I quoted the part of Secretary Fish's note to Minister Roberts, Oct. 10, 1869:

"The civil war in Cuba has continued for a year; battle after battle has been fought, thousands of lives have been sacrificed, and the result is still in suspense. * * * Riquelme, one of the ablest modern writers on international law (one for whom the world is indebted to Spain), says that: Foreign intervention in civil wars may be excusable when the interest of humanity evidently requires it; or when the essential interests of the State are injured by the civil war of a neighboring power. * * The undersigned has now to remind Mr. Roberts of the frequency with which, in the interest of humanity, he has been obliged to remonstrate against the atrocities and the cruelties which have attended the conflict in Cuba for the last year; and, if these cruelties and this inhumanity have not been confined to one party to the conflict, the force of the justification for intervention assigned by the eminent Spanish authority referred to has been so much the more pressing."

I then pressed these admissions in connection with other notorious facts in justification of the resolutions offered by me. I reviewed the course of France and England in conquest and expansion of empire, the world over. England especially took position on our Pacific Coast; threatened us along the whole of our Northern border; "flanked" us in the Gulf of Mexico; commanded at Gibraltar the Mediterranean Sea; guarded the great highway to the East, by her protegé the Viceroy of Egypt; circumvented us in China, and anticipated us in Japan; planted her standard in strong places of offense and defense the world over, and now uses Spain as an advanced post, commanding, in military phrase, all our intrenchments—holding the map of the Isthmus, which would, in our hands, give us, through a ship-canal, the commerce and supremacy in Eastern Asia and Japan and the Pacific isles—and all this was ignored, in order that a few ships and munitions of war should be sold by our merchants to the Spanish tyrants of Cuba! Well could I sympathize with the indignation of the great Chatham at those who boasted of putting a few miserable pepper-corns into the treasury at the loss of a great empire.

Such is the outline of my argument, which the concerted enemies of Cuban liberty last night attempted to suppress, and upon which I rest the justice and policy of my resolutions, which at last were unanimously adopted.

I take occasion more explicitly to remark that I stand by and with the Republican party, but hold that their representatives shall not rule but be ruled by the public will, when intelligently and fully made known.

Yours, truly, C. M. CLAY.

New-York, Jan. 20, 1870.

DEPARTURE OF FOREIGN MAILS.

SATURDAY, JAN. 22.

Mails for Europe via Southampton and Bremen, per steamship Union, from Hoboken, close at Post-Office at 11:30 a. m. Steamship sails at 2 p. m. A Supplementary Mail for paid letters only, made up on Bremen Pier, and closes at 1½ p. m.

Mails for France via Havre and Brest, per steamship Lafayette, Pier No. 50, N. R., close at the General Post-Office at 7 a. m. No Supplementary Mail.

MONDAY, JAN. 24.

Mails for Argentine Republic, Brazil, and St. Thomas, per steamship Merrimack, close at the General Post-Office at 10 a. m.

NEWS PACKAGES FOR THE PRESS.

Captains and pursers of vessels arriving at this port are requested to deliver packages addressed to the New-York Associated Press only to persons exhibiting the written authority of J. W. Simonton, General Agent. News packages for the *Journal of Commerce*, *Times*, TRIBUNE, *World*, *Sun*, *Express*, *Evening Post*, *Commercial Advertiser*, *Staats Zeitung*, and *New-Yorker Demokrat* should also be delivered only to the same persons.

FRIDAY'S WEATHER REPORT—9 a. m.

Places.	Atmosph's.	Ther.	Places.	Atmosph's.	Ther.
Port Hastings	Raining	36	Oswego	Cloudy	24
Portland	Cloudy	38	Buffalo	Cloudy	34
Boston	Cloudy	39	Pittsburgh	Clear	23
New-York	Hazy	38	Chicago	Clear	—
Philadelphia	Cloudy	40	Louisville	Clear	33
Wilmington	Cloudy	40	Mobile	Cloudy	58
Richmond	Clear	42	New-Orleans	Raining	58
Charleston	Cloudy	54	Key West	Clear	75
Savannah	Cloudy	62	Havana	Clear	75
Augusta, Ga	Cloudy	54			

PASSENGERS ARRIVED.

FROM LIVERPOOL, Jan. 8—In steamship Calabria—R. G. Muste, Mr. Orban, L. Hayman, G. H. Johnson and lady, W. E. W. Williams, H. W. Sharples, S. Matthew, Mr. Molson, L. B. Bruce, G. W. Cox, child and nurse; Henry P. Watson, T. F. Watson, D. McDonald, K. S. Digby, H. M. Collingham, J. Shiell, Richard Pardoe, A. B. Cook, R. Holme, C. F. Todhunter, W. Temple, F. G. Young, A. G. James.

FROM HAMBURG, Jan. 5—In steamship Holsatia—A. Rolfker, J. Alo, O. Nolde, J. Nathan, Marie and child, J. Thompson, Helene Meyer, C. F. Gersch, Gelle Meinesz, G. Paulus, Theo. Bussmann, Anton Griesedieck, wife and 3 children; Louis Frankel, F. Weissenborn, Fritz Meyer, Mr. and Mrs. J. Machon and 2 children; Sophie Friedmann, F. Black, B. Stephens, C. Roentzger, Mary Simes, S. Gubisome, Mr. Wood and family, C. Ahrens, J. Jacob, P. Jacob, C. Latzir, Ch. Johnson, Ch. Boell, R. Nesbit, A. Anderson, Mrs. Cross, D. Marisby, F. Saxton, Louis Selig.

MINIATURE ALMANAC.

Sun rises........7:19 | Sun sets.........5:05 | Moon rises..........11 05

HIGH WATER THIS DAY.

Sandy Hook....11:29 | Gov's Island.....12:13 | Hell Gate.......... 1:09

SHIPPING INTELLIGENCE.

PORT OF NEW-YORK..........................January 21.

CLEARED.

Steamships—Lafayette, Havre; Alaska, Aspinwall.

Barks—Contest, Rio Janeiro via Charleston; Arizona, Malaga; Atlantic, Barbadoes; Horace Beals, New-Orleans; Kong Sverre, Cardiff.

Brigs—Ann Elizabeth, Zaza; John Sanderson, Cienfuegos; Gipsey, St. Croix; Helen, Wilmington, N.C.

Schrs.—Comrade, Pernambuco; Catharine John, Matanzas; Annie E. A. Walton, Havana; Maud Webster, Jacksonville; Helen G. King, Norfolk; Albert Mason, Philadelphia; Horace L., Bridgeport; N. Bloomfield, Stamford; David Babcock, Matanzas; Harry Laddell, Richmond; Mary Chilton, Norfolk; E. F. Meany, Philadelphia.

ARRIVED.

Steamship Holsatia, Ehlers, Hamburg Jan. 5, and Havre Jan. 9, mdse. and pass.

Steamship Dacian, Messina Dec. 24, Palermo 27th, and Gibraltar Jan. 4, fruit, &c.

Steamship Wm. P. Clyde, Morgan, Wilmington, N.C., naval stores.

Steamship Brunette, Freeman, Philadelphia, mdse.

Steamship James Adger, Lockwood, Charleston, mdse. and pass.

Bark Bessie North, Faulkner, Los Passages (Spain) 43 days, old iron rails.

Bark Mary A. Way, Russell, Muscat 99 days, mdse.

Brig Pilgrim, Wright, Algoa Bay 60 days, wool.

Brig L. Warren, Harriman, Cardenas 11 days, molasses.

Schr. T. E. French, Doughty, Washington, N. C., 4 days, naval stores.

Schr. Perry, Cole, Eastport, fish.

Schr. E. M. Sawyer, Kelly, Calais, lumber.

Schr. Gen. Marion, Terry, Rockland, lime.

Schr. G. M. Partridge, Hall, Rockland, lime.

Schr. Willie Martin, Spear, Rockland, lime.

Schr. Corvo, Pykering, Rockland, lime.

Schr. R. S. Hodgdon, Hall, Rockland, lime.

SCHOONERS RIVER AND COASTWISE.

S. P. Godwin, Elizabethport. May Moores, Elizabethport.
Mary Anna, Elizabethport. P. C. Barnum, Elizabethport.
Edward Lindsley, Elizabethport. Justice, Elizabethport.
David Wasson, Elizabethport. Helen Smith, Elizabethport.
Phebe Elizabeth, Elizabethport. Lizzie Major, Elizabethport.
S. A. Hammond, Elizabethport. Paulliner, Elizabethport.
Hannibal, Elizabethport.

DOMESTIC PORTS.

BOSTON, Jan. 21.—Arrived, steamships Saxon, from Philadelphia, and Tom Kennedy, from Baltimore.